COMBINED MODULE OF FOLDING CONTAINER

Field of the Invention

The present invention relates to a combined module of a large folding container comprising a bottom, long side walls hinged to corresponding long-side bank portions of the bottom, and short side walls hinged to corresponding short-side bank portions of the bottom, the long and short side walls being capable of being folded so as to overlap the bottom, and a small folding container comprising a bottom that is substantially half as large as the bottom of the large folding container, long side walls which are hinged to corresponding long-side bank portions of the bottom of the small folding container and which are each substantially as large as the short side wall of the large folding container, and short side walls which are hinged to corresponding short-side bank portions of the bottom of the small folding container and which are each substantially half as large as the long side wall of the large folding container, the long and short side walls being capable of being folded so as to overlap the bottom.

Background of the Invention

A combined module of a folding container is conventionally known in which long-side bank portions of a bottom of a large folding container are formed to be lower than short-side bank portions of the bottom (for example, the

Unexamined Japanese Patent Application Publication (Tokkai-Hei) No. 2002-2696).

In the prior art, since the long-side bank portions of the bottom of the large folding container are formed to be the lower than short-side bank portions of the bottom, the bottom of the large folding container has insufficient strength and rigidity. Consequently, the large folding container is likely to be deformed when subjected to a load or twisted. This problem is more serious if a small folding container is stacked on the large folding container.

It is an object of the present invention to solve the above problem of the conventional combined module of the folding container.

Summary of the Invention

To accomplish this object, the present invention provides a combined module of a large folding container and a small folding container wherein long-side bank portions of a bottom of a large folding container are configured to be higher than short-side bank portions of the bottom.

Brief Description of the Drawings

Figure 1 is a perspective view showing that a large folding container constituting a combined module of a folding container according to the present invention has been assembled into a box shape.

Figure 2 is a perspective view showing that the large folding container shown in Figure 1 is being assembled or folded.

Figure 3 is a perspective view showing that the large folding container shown in Figure 1 has been folded.

Figure 4 is a perspective view of a back surface of a bottom of the large folding container shown in Figure 1.

Figure 5 is a partly enlarged perspective view of the back surface of the bottom of the large folding container shown in Figure 1.

Figure 6 is a perspective view showing that a small folding container constituting a combined module of a folding container according to the present invention has been assembled into a box shape.

Figure 7 is a perspective view showing that the small folding container shown in Figure 6 is being assembled or folded.

Figure 8 is a perspective view showing that the small folding container shown in Figure 6 has been folded.

Figure 9 is a perspective view of a back surface of a bottom of the small folding container shown in Figure 6.

Figure 10 is a enlarged perspective view showing that small folding containers each in a box state are stacked on the large folding container in a box state, which constitutes the combined module of the folding container according to the present invention.

Figure 11 is an enlarged perspective view showing that the large folding container in a box state is stacked on the small folding containers each in a box state, which constitute the combined module of the folding container

according to the present invention.

Detailed Description of the Preferred Embodiments

An embodiment of the present invention will be described below. However, the present invention is not limited to the present embodiment. Variations may be made to the embodiment without departing from the spirits of the present invention.

First, with reference to Figures 1 to 5, a description will be given of a large folding container Cb constituting a combined module of a folding container.

1 is a bottom that appears rectangular in a plan view. Long side walls 2 are hinged via appropriate hinge members to corresponding opposite long-side bank portions 1a of the bottom 1. Short side walls 3 are also hinged via appropriate hinge members to corresponding opposite short-side bank portions 1b of the bottom 1. The long-side bank portions 1a are configured to be higher than the short-side bank portions 1b. The hinging portion between the bottom 1 and each long side wall 2 is located higher than the hinging portion between the bottom 1 and each short side wall 3.

To fold the large folding container Cb assembled into a box shape as shown in Figure 1, the short side walls 3 are brought down to the inside of the large folding container Cb and laid on the bottom 1 as shown in Figure 2. Then, similarly, the long side walls 2 are brought down to the inside of the large

folding container Cb and laid on the bottom 1 and short side walls 3 as shown in Figure 3. In contrast, to assemble the large folding container Cb as shown in Figure 1, the large folding container Cb having been folded as shown in Figure 3, the long side walls 2 laid on the bottom 1 and short side walls 3 are set up substantially perpendicularly. Then, the short side walls 3 are set up substantially perpendicularly to assemble the large folding container Cb into a box shape.

Then, the bottom 1 will be described with reference to Figures 3 to 5.

A back surface of a bottom plate 1c is formed with a bottom fitting portion 1d having plurality of ribs 1d1 that are substantially parallel with the long-side bank portions 1a and a plurality of ribs 1d2 which are substantially parallel with the short-side bank portions 1b and which cross the ribs 1d1, the ribs 1d1, 1d2 extending downward from the back surface of the bottom plate 1c. The ribs 1d1, 1d2 are surrounded with a peripheral frame 1d3, and the bottom fitting portion 1d is composed of the ribs 1d1, 1d2 and the peripheral frames 1d3.

In the present embodiment, the bottom fitting portion 1d is divided into two sub-fitting portions 1d' by a groove 4 extending parallel with the short-side bank portions 1b. In the present embodiment, since the bottom fitting portion 1d is composed of the two sub-fitting portions 1d', arranged across the groove 4, the peripheral frames 1d3 are also configured to surround the crossing ribs 1d1, 1d2, which constitute the sub-fitting portions 1d'. Four

protruding portions 1f are formed in respective corner areas of the bottom fitting portion 1d, in other words, corner areas of each sub-fitting portion 1d' which are closer to corner portions 1e of the bottom 1. The protruding portions 1f extend toward the corresponding corner portions 1e of the bottom 1.

Each of the protruding portions 1f has a long side wall portion 1f1 extending parallel with the long-side bank portions 1a and a short side wall portion 1f2 extending parallel with the short-side bank portions 1b. Via an inclined portion 1f3 extending in the direction of the peripheral frames 1d3 forming the bottom fitting portion (sub-fitting portion 1d'), the long side wall portion 1f1 is connected to the corresponding peripheral frame 1d3 located parallel with the long-side bank portions 1a. Likewise, via an inclined portion 1f4 extending in the direction of the peripheral frames 1d3 forming the bottom fitting portion (sub-fitting portion 1d'), the short side wall portion 1f2 is connected to the corresponding peripheral frame 1d3 located parallel with the short-side bank portions 1b. The above ribs 1d1, 1d2 are also formed in a space surrounded by the long side wall portion 1f1, the short side wall portion 1f2, and the inclined portions 1f3, 1f4.

Corner blocks 1g appearing generally L-shaped in a plan view are formed at respective ends of each long-side bank portion 1a of the bottom 1. An inner step portion 1g1 is formed in each corner block 1g. When folded large folding containers Cb are stacked on one another, each protruding portion 1f of the bottom fitting portion 1d of the large folding container Cb located above is

fitted in the corresponding inner step portion 1g1 of the corner block 1g formed in the bottom 1 of the large folding container Cb located below.

An engaging concave portion 3a extending in a vertical direction is formed in each upper corner area of an outer wall surface (a surface located outside the large folding container Cb when it is assembled into a box shape) of the short side wall 3. A plurality of fitting projections 3a1 are formed in each engaging concave portion 3a. A horizontally elongate fitting concave portion 3b is formed in each upper corner area of an inner wall surface (a surface located inside the large folding container Cb when it is assembled into a box shape) 3' of the short side wall 3. The fitting concave portion 3b is formed of a bottom 3b1, an inclined portion 3b2 formed closer to the center of the short side wall 3, and an interior wall 3b3. The fitting concave portion 3b is open in its top, inside and end opposite to the inclined surface 3b2.

An engaging frame 2a is extended from an upper part of each vertical end of the long side wall 2 in the direction of the corresponding short side wall 3. Through-holes 2a1 are drilled in the engaging frame 2a so that the fitting projections 3a1, projected from the above described engaging concave portion 3a of the short side wall 3, can be fitted in the respective through-holes 2a1. When the large folding container Cb is assembled into a box shape, the engaging frame 2a, formed in the upper portion of the vertical end of the long side wall 2, fits into the engaging concave portion 3a, formed in the corresponding upper corner area of the adjacent short side wall 3. Furthermore, the fitting

projections 3a1, projected from the engaging concave portion 3a of the short side wall 3, fit into the corresponding through-holes 2a1, drilled in the engaging frame 2a of the long side wall 2. Consequently, the large folding container Cb assembled into a box shape is not easily collapsed toward the bottom 1.

A horizontally elongate fitting concave portion 2b is formed in each upper corner area of an inner wall surface (a surface located inside the large folding container Cb when it is assembled into a box shape) 2' of the long side wall 2, the upper corner area being adjacent to the engaging frame 2a. The fitting concave portion 2b is formed of a bottom surface 2b1, an inclined surface 2b2 formed closer to the center of the long side wall 2, an interior wall 2b3 and an inner wall surface 2a2 of the engaging frame 2a. The fitting concave portion 2b is open in its top and inside.

When the large folding container Cb is assembled into a box shape, a protruding portion fitting concave portion 5 appearing substantially L-shaped in a plan view is formed in each inner corner of the large folding container Cb, by the corresponding horizontally elongate fitting concave portion 3b, formed in the upper corner area of the inner wall surface 3' of the short side wall surface 3, and the corresponding horizontally elongate fitting concave portion 2b, formed in the upper corner area of the inner wall surface 2' of the long side wall surface 2.

When large folding containers Cb each assembled into a box shape are

stacked on one another in the vertical direction, each protruding portion 1f of the bottom fitting portion 1d of the bottom 1 of the large folding container Cb located above is fitted into the corresponding protruding portion fitting concave portion 5 of the large folding container Cb located below. Furthermore, those parts of the back surface of the bottom plate 1c of the bottom 1 which are located around the periphery of the bottom fitting portion 1d of the large folding container Cb located above are placed on a top surface 2" of each long side wall 2 and a top surface 3" of each short side wall 3 of the large folding container Cb located below.

Since the protruding portions 1f are formed in the respective corner portions of the bottom fitting portion 1d of the bottom 1 as described above, the large folding container Cb can be stably placed on a floor or the like. It is also possible to prevent the corner portions of the bottom 1 from being deformed or buckled by a downward load.

Moreover, when folded large folding containers Cb are stacked on one another in the vertical direction, each protruding portion 1f of the bottom fitting portion 1d of the bottom 1 of the large folding container Cb located above is fitted into the corresponding inner step portion 1g1 of the corner block 1g formed in the bottom 1 of the large folding container Cb located below. This limits the horizontal movement of the folded large folding container Cb. Therefore, folded large folding containers Cb can be stably stacked on one another in the vertical direction.

Now, a small folding container Cs will be described with reference to Figures 6 to 9. However, the small folding container Cs has substantially the same structure as that of the above described large folding container Cb. Accordingly, the detailed description of the small folding container Cs is omitted. The constituent members of the small folding container Cs which correspond to those of the large-scale folding container Cb are denoted by adding 0 (zero) to each of the reference numbers of the constituent members of the large folding container Cb.

The small folding container Cs is also composed of a bottom 10 that appears rectangular in a plan view, long side walls 20 hinged to corresponding opposite long-side bank portions 10a of the bottom 10, and short side walls 30 hinged to corresponding opposite short-side bank portions 10b of the bottom 10. The long-side bank portions 10a are configured to be higher than the short-side bank portions 10b.

The bottom 10 of the small folding container Cs has substantially the same size as that obtained by dividing the bottom 1 of the large folding container Cb into two along the short-side bank portions 1b. Each long side wall 20 of the small folding container Cs is substantially as large as each short side wall 3 of the large folding container Cs. Each short side wall 30 of the small folding container Cs has substantially the same size as that obtained by dividing each long side wall 2 of the large folding container Cb into two along vertical sides of the long side wall 2.

As in the case of the bottom 1 of the large folding container Cb, a back surface of the bottom 10 of the small folding container Cs is formed with a bottom fitting portion 10d having protruding portions 10f in its respective corner portions. Corner blocks 10g each having an inner step portion 10g1 are formed at respective ends of each long-side bank portion 10a of the bottom 10.

The long side wall 20 is formed with engaging frames 20a each extending from an upper part of a vertical end of the long side wall 20 in the direction of the corresponding short side wall 30. Through-holes 20a1 are drilled in each engaging frame 20a. A horizontally long fitting concave portion 20b is formed in each upper corner area of an inner wall surface 20' of the long side wall 20, the upper corner area being adjacent to the engaging frame 20a.

An engaging concave portion 30a is formed in each upper corner area of an outer wall surface of the short side wall 30, and a plurality of fitting projections 30a1 are projected from the engaging concave portion 30a. A horizontally elongate fitting concave portion 30b is formed in each upper corner area of an inner wall surface 30' of the short side wall 30.

As in the case of the large folding container Cb, the above described small folding container Cs can be folded by bringing down the short side walls 30 of the small folding container Cs assembled into a box shape as shown in Figure 6, to the inside of the small folding container Cs to lay them on the bottom 10 as shown in Figure 7, and then bringing down the long side walls 20 to the inside of the small folding container Cs to lay the long side walls 20 on the bottom

10 and short side wall 30 as shown in Figure 8.

Furthermore, two small folding containers Cs can be stacked on the large folding container Cb by placing the two small folding containers Cs each assembled into a box shape, on the large folding container Cb also assembled into a box shape so that the short side walls 30 of the small folding container Cs are located on the corresponding long side walls 20 of the large folding container Cb and so that the long side walls 30 of the small folding container Cs are located on the corresponding short side walls 3 of the large folding container Cb, as shown in Figure 10.

As shown in Figure 1 and Figure 2, a concave portion 2c that is open in its top and inside is formed in a central portion of the top surface 2" of each long side wall 2 of the large folding container Cb so that the corresponding protruding portions 10f of the bottom fitting portions 10d each formed on the back surface of the bottom 10 of the small folding container Cs can be fitted into the concave portion 2c. Thus, when the two small folding containers Cs each assembled into a box shape are placed on the large folding container Cb also assembled into a box shape, the protruding portions 10f of the bottom fitting portions 10d each formed on the back surface of the bottom 10 of the small folding container Cs are fitted into the concave protions 2c of the large folding container Cb.

Similarly, as shown in Figure 11, the large folding container Cb can placed on two small folding containers Cs arranged so that their corresponding long

side walls 20 are contacted with each other. In this case, the top portions of the juxtaposed long side walls 20 of the two small folding containers Cs, located below, are fitted into the groove 4, formed between the sub-fitting portions 1d' of the bottom 1 of the large folding container Cb located above.

As described above, in a combined module of the large folding container Cb and the small folding container Cs, the long-side bank portions 1a of the bottom 1 of the large folding container Cb are configured to be higher than the short-side bank portions 1b of the bottom 1. This improves the strength and rigidity of the bottom 1 of the large folding container Cb. Therefore, the large folding container Cb can be prevented from being deformed or damaged by a load or twist.

Furthermore, the upper end of each long-side bank portion 1a of the bottom 1 of the large folding container Cb, including the corner blocks 1g formed at the respective ends of each long-side bank portion 1a, is preferably formed to be flat like a substantially straight line so that the corner blocks 1g do not project upward from the other portions of the long-side bank portion 1a, in other words, that part of the long-side bank portion 1a which is located between the corner blocks 1g. This arrangement further prevents the large folding container Cb from being deformed or damaged by a load or twist.

In the example shown in the above described embodiment, the two small folding containers Cs are stacked on the large folding container Cb. However, three or more small folding containers Cs can be stacked on the large folding

container Cb by properly setting the size of the small folding container Cs relative to the large folding container Cb.

The present invention is configured as described above and thus produces the effects described below.

The long-side bank portions 1a of the bottom 1 of the large folding container Cb are configured to be higher than the short-side bank portions 1b of the bottom 1. This improves the strength and rigidity of the bottom 1 of the large folding container Cb. Therefore, the large folding container Cb can be prevented from being deformed or damaged by a load or twist.